COLOR DIGITAL WIRELESS SURVEILLANCE SYSTEM

& INDOOR/OUTDOOR COLOR CAMERA(S) WITH AUDIO

Instruction Manual

English Version 1.1

MODELS:

LW2100 Series

LOREX™

www.lorexcctv.com

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Thank you for purchasing the LW2100 SERIES COLOR DIGITAL WIRELESS SURVEILLANCE SYSTEM. Lorex is committed to providing our customers with a high quality, reliable security product.

http://www.lorexcctv.com

Wireless Disclaimer:

This product broadcasts over public airways. Digital Wireless is a secure signal, however video and audio signals *may be* intercepted without your consent.

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RICK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK).
NO USER SERVICABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the products ‘ enclosure that may be of sufficient magnitude to constitute a risk of electric shock

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

CAUTION: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF THE PLUG TO THE WIDE SLOT AND FULLY INSERT.

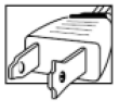
Please visit us on the web for the most current Manuals, Quick Start Guides and Firmware. Additional Language Manuals are also available at:
http://www.lorexcctv.com

Important Safeguards

In addition to the careful attention devoted to quality standards in the manufacture process of your video product, safety is a major factor in the design of every instrument. However, safety is your responsibility too. This sheet lists important information that will help to assure your enjoyment and proper use of the video product and accessory equipment. Please read them carefully before operating and using your video product.

Installation

1. **Read and Follow Instructions** - All the safety and operating instructions should be read before the video product is operated. Follow all operating instructions.
2. **Retain Instructions** - The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** - Comply with all warnings on the video product and in the operating instructions.
4. **Polarization** - Do not defeat the safety purpose of the polarized or grounding-type plug.
   - o A polarized plug has two blades with one wider than the other.
   - o A grounding type plug has two blades and a third grounding prong.
   - o The wide blade or the third prong is provided for your safety.
   - o If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet



5. **Power Sources** - This video product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your location, consult your video dealer or local power company. For video products intended to operate from battery power, or other sources, refer to the operating instructions.
6. **Overloading** - Do not overload wall outlets of extension cords as this can result in the risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation, and broken plugs are dangerous. They may result in a shock or fire hazard. Periodically examine the cord, and if its appearance indicates damage or deteriorated insulation, have it replaced by your service technician.
7. **Power-Cord Protection** - Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the video product.
8. **Ventilation** - Slots and openings in the case are provided for ventilation to ensure reliable operation of the video product and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the video equipment on a bed, sofa, rug, or other similar surface. This video product should never be placed near or over a radiator or heat register. This video product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the video product manufacturer's instructions have been followed.
9. **Attachments** - Do not use attachments unless recommended by the video product manufacturer as they may cause a hazard.
10. **Water and Moisture** - Do not use this video product near water. For example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, near a swimming pool and the like.

    Caution: Maintain electrical safety. Power line operated equipment or accessories connected to this unit should bear the UL listing mark of CSA certification mark on the accessory itself and should not be modified so as to defeat the safety features. This will help avoid any potential hazard from electrical shock or fire. If in doubt, contact qualified service personnel.
11. **Accessories** - Do not place this video equipment on an unstable cart, stand, tripod, or table.
    The video equipment may fall, causing serious damage to the video product. Use this video product only with a cart, stand, tripod, bracket, or table recommended by the manufacturer or sold with the video product.

    Any mounting of the product should follow the manufacturer's instructions and use a mounting accessory recommended by the manufacturer.

Service

13. **Servicing** - Do not attempt to service this video equipment yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

14. **Conditions Requiring Service** - Unplug this video product from the wall outlet and refer servicing to qualified service personnel under the following conditions.
    - **A.** When the power supply cord or plug is damaged.
    - **B.** If liquid has been spilled or objects have fallen into the video product.
    - **C.** If the video product has been exposed to rain or water.
    - **D.** If the video product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the video product to its normal operation.
    - **E.** If the video product has been dropped or the cabinet has been damaged.
    - **F.** When the video product exhibits a distinct change in performance. This indicates a need for service.

15. **Replacement Parts** - When replacement parts are required, have the service technician verify that the replacements used have the same safety characteristics as the original parts. Use of replacements specified by the video product manufacturer can prevent fire, electric shock or other hazards.

16. **Safety Check** - Upon completion of any service or repairs to this video product, ask the service technician to perform safety checks recommended by the manufacturer to determine that the video product is in safe operating condition.

17. **Wall or Ceiling Mounting** - The cameras provided with this system should be mounted to a wall or ceiling only as instructed in this guide, using the provided mounting brackets.

18. **Heat** - The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

Use

19. **Cleaning** - Unplug the video product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

20. **Product and Cart Combination** - Video and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the video product and car combination to overturn

21. **Object and Liquid Entry** - Never push objects for any kind into this video product through openings as they may touch dangerous voltage points or “short-out” parts that could result in a fire or electric shock. Never spill liquid of any kind on the video product

22. **Lightning** - For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the video product due to lightning and power line surges. The manufacturer’s instructions and use a mounting accessory recommended by the manufacturer.

General Precautions

1. All warnings and instructions of this manual should be followed
2. Remove the plug from the outlet before cleaning. Do not use liquid aerosol detergents. Use a water dampened cloth for cleaning
3. Do not use this unit in humid or wet places
4. Keep enough space around the unit for ventilation. Slots and openings in the storage cabinet should not be blocked
5. During lightning storms, or when the unit is not used for a long time, disconnect the power supply, antenna, and cables to protect the unit from electrical surge

FCC CLASS B NOTICE

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not in-stalled and used in accordance with the instruction, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (which can be determined by turning the equipment on and off), the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio or television technician for assistance

This equipment has been certified and found to comply with the limits regulated by FCC, EMC, and LVD. Therefore, it is designated to provide reasonable protection against interference and will not cause interference with other appliance usage.

However, it is imperative that the user follows this manual' guidelines to avoid improper usage which may result in damage to the unit, electrical shock and fire hazard injury

In order to improve the feature functions and quality of this product, the specifications are subject to change without notice from time to time.

LOREX TECHNOLOGY INC.

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Features

- Frequency Hopping Spread Spectrum
- High Transmission Power
- Encrypted Technology
- Interference Fee
- Superior Image and Sound Quality
- Latest Ultra Digital Wireless Technology Provides Excellent Image Quality and Clarity
- Up to 450ft Wireless Transmission Range**
- Weather Resistant Metal Camera is Great for Indoor/Outdoor Surveillance ***
- Listen in with Exceptional Sound Clarity
- Safety Warning Feature Notifies You When out of Range

* Maximum open space transmission range. The actual range is dependent upon building materials and other obstructions in path of wireless signal.
**IR illumination range of 23 ft. / 7m under ideal conditions. Objects at or beyond this range may be partially or completely obscured, depending on the camera application.
*** LW1010 requires the Optional 2nd Camera

The Digital Wireless signal transmission type used by the Lorex LW2100 series is also known as **FHSS – Frequency Hopping Spread Spectrum**. This type of signal is highly resistant to deliberate jamming as it generates a channel hopping sequence using an algorithm generated by the receiver system.

The 2.4GHz (2.400-2.483Ghz) band is being divided into sections or paths of 2MHz per section, and each second the transmission signal hops hundreds of times in a specified sequence within this frequency range. The overall bandwidth required for frequency hopping is much wider then 2MHz however because transmission occurs only on a small section of this bandwidth at any given time, the signal being transmitted does not suffer from greatly reduced signal degradation and also avoids blocked paths other devices who act as sources of competing signals.

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Getting Started

The System comes with the following components:

1 x WIRELESS RECEIVER

1 x WIRELESS CAMERA(S)*

1 x POWER ADAPTOR (FOR RECEIVER)

1 x POWER ADAPTOR(S) (FOR CAMERA) *

1 x RECEIVER ANTENNA
1 x CAMERA ANTENNA(S) *

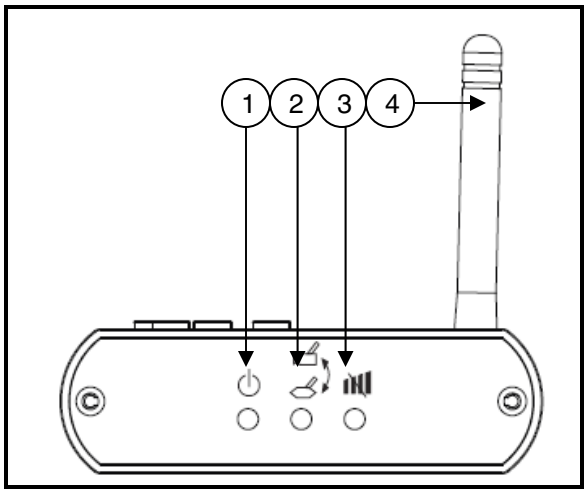
1 x RCA VIDEO CABLE

1 x CAMERA BATTERY PACK(S) *

CHECK YOUR PACKAGE TO CONFIRM THAT YOU HAVE RECEIVED THE COMPLETE CAMERA SYSTEM, INCLUDING ALL COMPONENTS SHOWN ABOVE.

*** 1 of each provided with each Camera. Please see your System Package for the number of cameras included with your System.**

Wireless Receiver

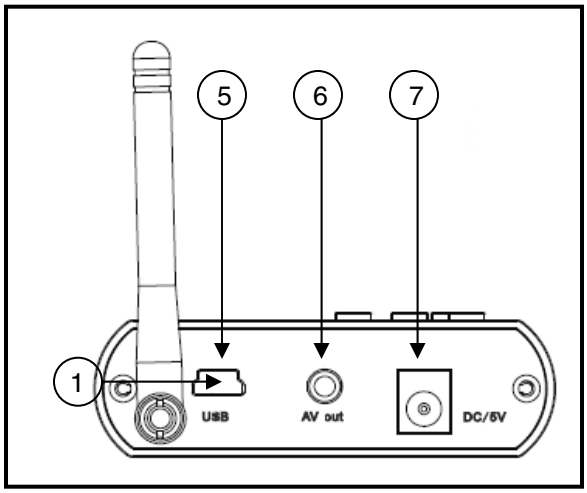


1. **Power LED** – Indicates the Power state of the Receiver.

2. **Pairing LED** – Flashes when the system is attempting to pair with a Camera (See the Menu for details on Pairing a Camera Channel).

3. **Signal LED** – Flashes to indicate the signal quality

4. **Receiver Antenna** – Connect the Antenna to the Receiver to receive wireless signals from the camera(s).



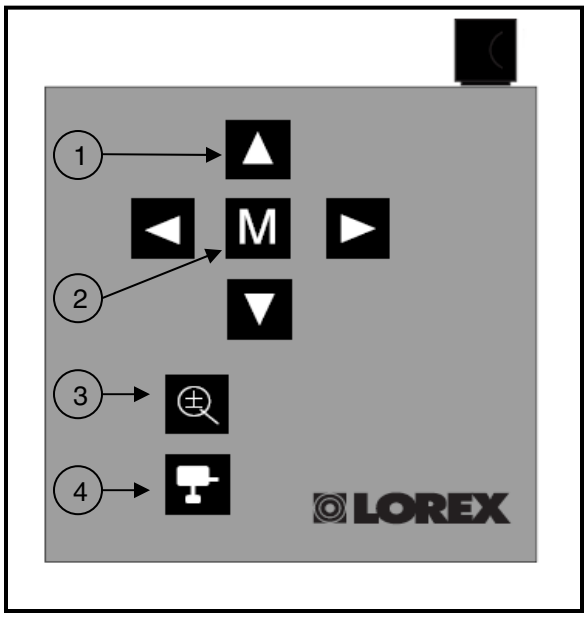
5. **USB Port** – Currently not in use in this product.

6. **AV OUT** – Connect the provided AV Cable to the Receiver. Connect the Audio and Video ends of the cable to a TV, VCR or other viewing device.

7. **DC 9V INPUT** – Connection port for the 9V Power Adaptor (provided with this system). Connect the Power Adaptor to a power source.

NOTE: It is recommended that the receiver be connected to a power surge bar to protect the equipment from damage.

Wireless Receiver Buttons



1. ▲▼◄► Buttons – Press the Up, Down, Left or Right buttons to navigate in Menu Mode. Use these buttons to change the image in ZOOM Mode (QVGA Mode Only).

2. **MENU Mode Button** – Press the **M** to enter or exit Menu Mode.

3. **ZOOM Button** – Press the ZOOM Button to Zoom In (QVGA) or Zoom Out.

4. **CAM Button** – Press the CAM Button to switch to a different Camera on the Receiver.

Wireless Receiver Installation

1. Connect the Antenna to the receiver.
2. Connect the AV Cable to the back of the receiver. Connect the other end of the Cable to the Video IN (Yellow) and Audio IN (White) ports on the TV, VCR or other viewing monitor.
3. Plug the Receiver power cable into the 9V POWER input. Plug the power cable into a wall outlet or surge protector.
4. Place the receiver in a place that will have clear reception to your camera(s).

Camera Installation

Before you install the camera, carefully plan where and how it will be positioned, and where you will route the cable that connects the camera to the power adaptor or battery adaptor.

Installation Warnings:

- Aim the Cameras to best optimize the viewing area: Select a location for the camera that provides a clear view of the area you want to monitor, which is free from dust, and is not in line-of-sight to a strong light source or direct sunlight.
- Avoid installing the cameras where there are thick walls, obstructions, or interference (i.e. transformers, microwave ovens or other electrical equipment) between the Cameras and the Receiver.
- Select a location for the camera that has an ambient temperature between 14°F~113°F (-10°C~45°C)
- Before starting permanent installation, have another person hold the camera for you while you verify its performance by observing the image on a monitor.

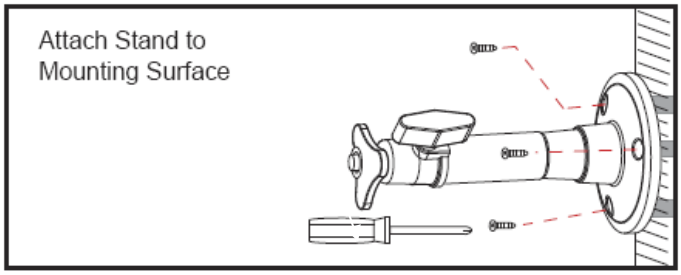
Night Vision

This camera includes IR LEDs, which provide the camera with the ability to view images in low light conditions. It is important to use the provided power adaptor (and not the 9V DC Battery Adaptor) when using the camera for prolonged periods in low light conditions, as the LEDs will drain the battery more quickly than regular daytime use.

Installing the Camera:

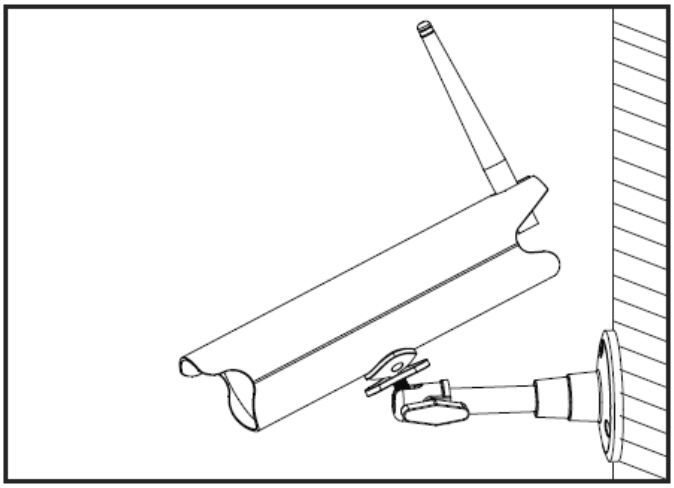
1. Carefully unpack the Camera.

2. Mount the stand to the wall:
   - Mark the position of the screw holes on the wall.
   - Drill holes and insert the drywall plugs as needed.
   - Firmly attach the stand to the wall using the provided screws.



3. Attach the Antenna to the Camera prior to mounting.

3. Place the camera in the desired mounting position. Tighten the thumbscrews to secure the camera to the Stand. Adjust the angle of the camera until the desired view is set.



Connecting Camera Power

The Camera can be powered either by using the provided Power Adaptor, or using the included Battery Pack (with 4 x AA Batteries).

NOTE: Wireless cameras require a power source (either an electrical outlet or battery power) to operate. If you plan to permanently mount the camera in a location, it is recommended to use the included Camera Power adaptor to prevent interruptions in the image, as the battery adaptor is intended as a temporary power solution.

POWER ADAPTOR:

Connect the Power Adaptor to the Camera. Make sure the power adaptor is placed into a grounded outlet or surge bar to protect the camera from power fluctuations.

Power Adaptor: Connect the Power Adaptor to the Female Barrel Power termination on the camera.

BATTERY PACK:

1. Slide the cover off the Battery Pack.

2. Insert 4 x AA Batteries (not included) into the Battery Pack. Make sure to correctly line up the Positive (+) and Negative (-) terminals of the batteries.

Slide the Battery Pack cover back on.

3. Connect the Battery Pack to the Camera. To turn the Camera ON of OFF, simply connect the BatteryPack.

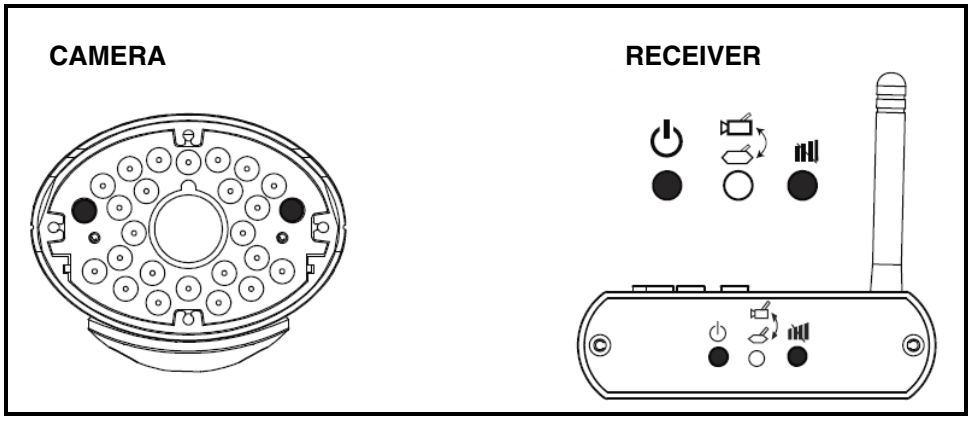
NOTE: It is recommended to remove the battery pack from the camera when not in use.

Battery: Connect the Camera Battery Adaptor cable to the Female Barrel Power termination on the camera. Connect a battery to the cable.

Wireless Connection LED Indicator

When the Receiver and Camera are connected:

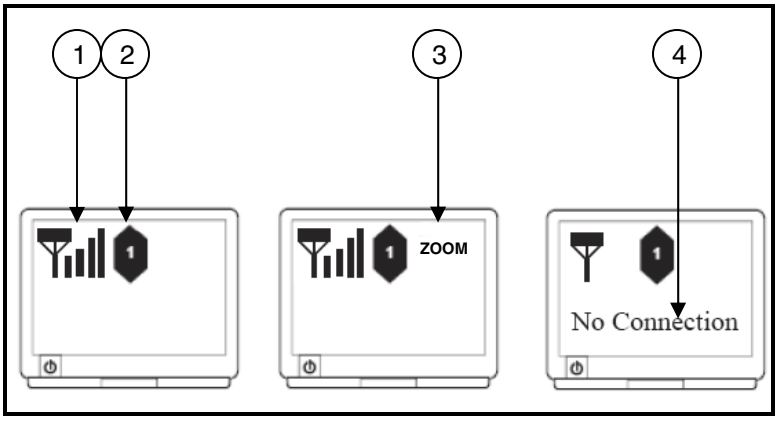
- The Camera will have IR LEDs indicating that there is a connection
- The Wireless receiver Wiresless Indicator LED will be lit



Viewing Mode

1. **SIGNAL INDICATOR** – The signal indicator shows the strength of the signal being received from the camera.

The number of bars in the Signal Indicator shows the strength of the signal – One or No Bars indicates the signal is poor, and 4 bars indicate a very strong signal.

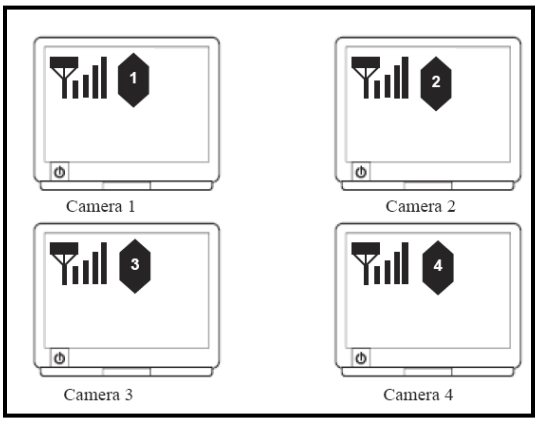


Signal Indicators:

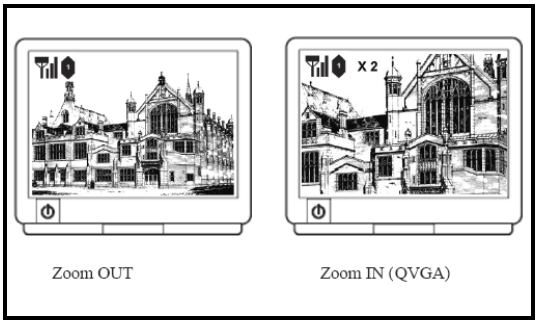
Signal Strength	Indicator	Data Rate	VGA Frames	QVGA Frames
Perfect		1062~1280 Kbps	5~10 FPS	15~30 FPS
Good		725~1062 Kbps	3~5 FPS	12~20 FPS
Fair		543~725 Kbps	2~4 FPS	8~15 FPS
Low		250~543 Kbps	0~1 FPS	0~4 FPS
No Signal		Under 250Kbps	0 FPS	0 FPS

2. **CHANNEL INDICATOR** – Displays the current channel number. Press the CAM Button on the Receiver to switch between available cameras

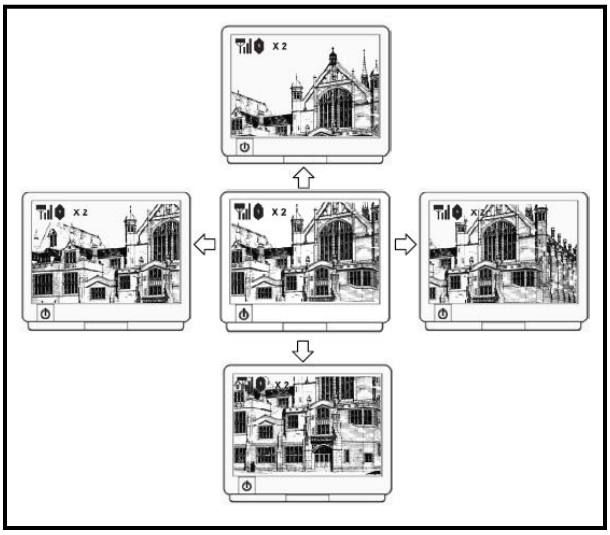
NOTE: To automatically switch between channels, configure the Auto Scan settings in Menu Mode.



3. **ZOOM INDICATOR** – Press the ZOOM Button on the Receiver to go into ZOOM IN Mode (QVGA Mode ONLY).



While in ZOOM MODE, you can Pan and Tilt the Camera image using the Arrow keys on the receiver.



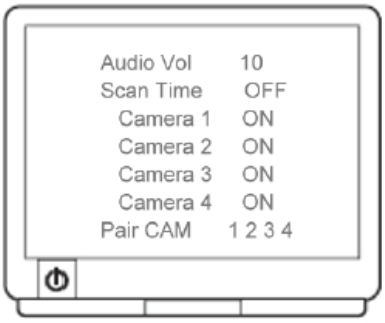
4. **STATUS INDICATOR** – The Status indicator message “No Connection” will appear when a camera cannot be found.

NOTE: There may be temporary signal losses for less than 1 second, due to the handshake process between the Camera and Receiver (when switching between channels).

Advanced Menu Mode

Press the MENU Button on the Receiver to enter MENU Mode. Use the ▲▼◄► Buttons to navigate UP, Down, Left or Right in the menu.

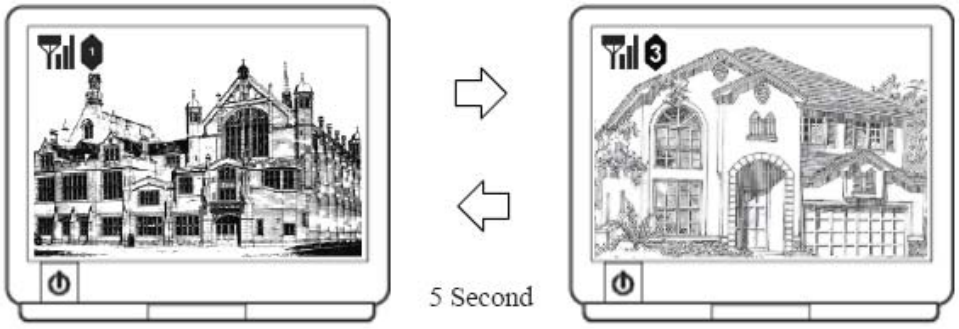
1. AUDIO VOLUME – Use the Left and Right arrows to change the Audio Volume from 0 (off) to 20 (high).



2. **SCAN TIME** – Sets the Auto Sequence to OFF (you must press the CAM Button on the receiver to see other channels), or 5 Second, 10 Second or 15 Second Auto scanning.

NOTE: Before turning on the Auto Sequence, make sure all cameras are paired to the System.

Use the ▲▼◄► arrows to navigate to each camera. Turn each camera to ON or OFF for Auto Detection.



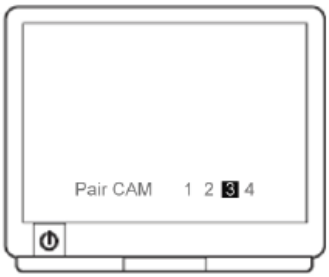
Camera Pairing

The System comes with camera(s) that have already been paired. The Pairing Function assigns each Camera to a different channel on the Wireless Receiver (up to 4 Cameras), and is necessary for configuring additional cameras.

NOTE: It is highly recommended to pair the Cameras to the Receiver before permanently mounting the Cameras.

1. Power on the Camera by connecting the Power Adaptor or Battery Pack. The transmit lights on the front of the Camera should be ON.

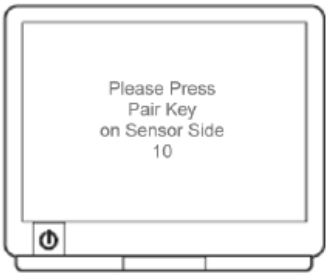
2. Navigate to the PAIR CAM Menu option, by pressing the MENU Button on the Receiver, and using the ▲▼◄► keys to navigate. Select the desired Pairing channel.



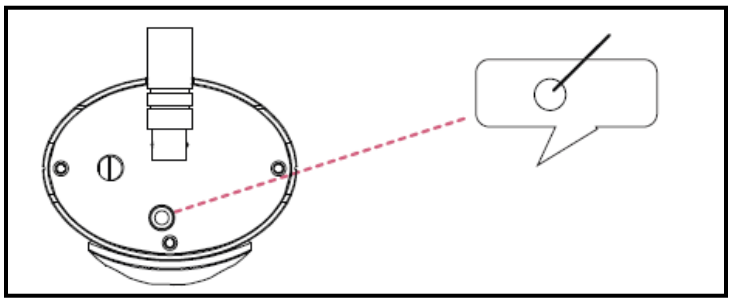
3. The screen will display the following message:

Please Press Pair Key on Sensor Side

The number indicates the countdown of time left for the pairing process.

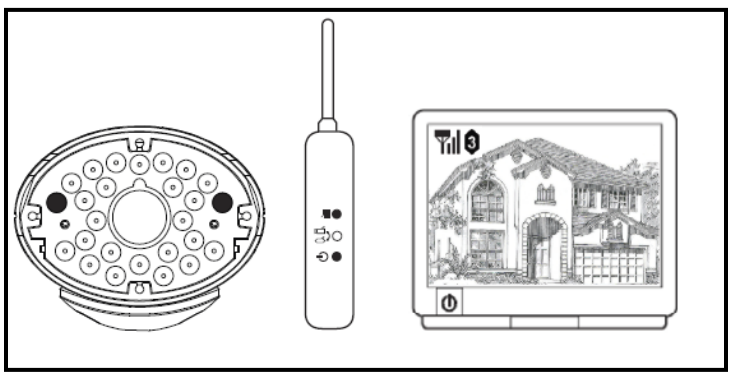


4. Press the Pairing Button on the back of the Camera.



Once the Pairing has been successfully completed:

- The Camera Transmit indicator LEDs will be illuminated
- The Receiver Status Indicator LED will be illuminated
- The Camera Information (channel, transmission strength, etc.) will appear onscreen.



Troubleshooting

If you have problems with your System, there is often a quick and simple solution. Please try the following:

Problem	Solution
There is no picture from a Camera.	• Check all connections to the Camera. Make sure the adaptor is plugged in. • Make sure that the Cameras and Receiver are both ON. • Make sure that the camera is in range of the Receiver. • If using the battery adaptor, try replacing the Batteries
There is Interference with the Camera Picture.	• Make sure that each camera is within range, and that there are no large obstructions or interference • Try repositioning the camera, receiver or both to improve the reception.
There are problems with the Audio.	• Ensure that the volume on the TV is ON • Make sure that the sound is occurring within range of the Camera Microphone • If the unit emits a loud screeching noise (feedback), move the camera or receiver farther apart.

Appendix #1 - Receiver Specifications

Receiver	
Receiving Frequency Range	2.400GHz~2.485GHz
RX Sensitivity	-82dBm
Demodulation	GFSK
Data Rate	2Mbps
Display Size/Type	VGA (640x240) or QVGA (320x240)
A/V Output	3.5mm Stereo Jack. Video: 640x480 or 320x240.
Power Requirement	5.0Vdc +/-10%
Power Consumption	250mA Max
Operating Temp Range	14°F ~ 104°F -10° ~ 40° C
Operating Humidity	10% ~ 80% RH

Appendix #2 - Camera Specifications

Camera(s)	
Transmit Frequency Range	2.400GHz~2.485GHz
TX Power	13.5dBm
Data Rate	2Mbps
Modulation	GFSK
TX Range	328 ft. / 100m Line in Sight
Image Sensor Type	1/4" VGA CMOS Image Sensor
Effective Pixel	H: 640, V: 480
Image Processing	Motion JPEG
Image Resolution	H: 640, V: 480 @ 5~7fps, H: 320, V: 240 @ 20fps
Lens	3.6mm F 2.0
Viewing Angle	H: 54° / V: 37°
AGC	On
AES	ERS (Electric Rolling Shutter)
Power Requirement	5.0Vdc +/-10%.
Power Consumption	450mA Max with IR LED, 345mA Max without IR LED.
Operating Temp Range	14°F ~ 104°F -10° ~ 40° C
Environment Rating	IP44
Built-in IR LED	23 Units of IR LED (850nm Type) for Night Vision
Built-in Auto IR Turn On/Off	CdS Drive Auto IR LED turn On/Off Circuit
Weatherproofing Housing	IP44 Rated Metal Bullet Housing with Metal Mounting Stand.

Appendix #3 – Digital Wireless Technology

The Digital Wireless signal transmission type used by the Lorex LW2100 series is also known as **FHSS – Frequency Hopping Spread Spectrum**. This type of signal is highly resistant to deliberate jamming as it generates a channel hopping sequence using an algorithm generated by the receiver system.

The 2.4GHz (2.400-2.483Ghz) band is being divided into sections or paths of 2MHz per section, and each second the transmission signal hops hundreds of times in a specified sequence within this frequency range. The overall bandwidth required for frequency hopping is much wider then 2MHz however because transmission occurs only on a small section of this bandwidth at any given time, the signal being transmitted does not suffer from greatly reduced signal degradation and also avoids blocked paths other devices who act as sources of competing signals. The strength of the signal being transmitted is set to be from 13.5-16dBm, which is much higher then the analog transmission signal allowed by authorities around the Globe (see next 2 slides for a comparison).

When an image is captured by the camera it is instantly converted from an analog to digital signal and packaged into small packets. With each successful transmission via the 2Mhz paths discussed above, the packets of information containing images are delivered to the receiver and decoded into analog information. The information can then be displayed on devices that are connected to the wireless receiver (RX).

A device pairing process is required to synchronize the transmitter (TX, Camera) and the receiver (RX). This allows the transmitter and receiver to be on the same frequency and use the same algorithm for frequency hopping. This ensures that only the paired transmitter and receiver can maintain communication signal by hopping to the same frequency paths at the exact same time. As a result, the chance that other devices within the same frequency range are on the same frequency, at the same time and in the same order is extremely unlikely. Note that the pairing process is already done at the factory for products that ship within the same packaging. Only when add-on devices are purchased is a pairing process required.